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Fiscal Policy and Labor Markets at Times of Public Debt

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ABSTRACT: This paper explores the empirical relevance of public debt accumulation for labor market institutions and outcomes. In theory, since debt service obligations act as a constraint on policy choices, past debt accumulation and current interest rates should influence reform incentives and labor market performance. Empirically, employment and unemployment rates are strongly associated with debt stock and debt service indicators over five-year periods along 1980-2000 public debt and interest-rate stabilization cycles. Significant and sensible relationships are apparent between debt service, interacted with country-specific policy indicators, and labor market policy changes. While only further data and research may disentangle the force that jointly shape public finance and labor market developments, past evidence suggests that aggregate fiscal policy reactions to the 2008-09 crisis will have persistent labor market implications.

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Like any other fiscal instrument, labor taxes and employment or unemployment subsidies trigger market responses (Tullio, 1987). Labor taxes affect their own base by decreasing employment incentives; in-work subsidies similarly generate deadweight losses when the composition of employment responds endogenously to their availability; even more obviously, more generous unemployment subsidies tend to increase unemployment. Employment protection legislation (EPL) has no direct implications for government finances, and does not generally affect average employment. But EPL, too, decreases the country's tax base, because it lowers productivity by preventing efficient labor reallocation. Of course the fact that labor market policies (like most taxes) are expensive in terms of output efficiency does not deny that they can be useful, because their main purpose is not maximization of aggregate employment and output: labor taxes, subsidies, and EPL aim at protecting of workers from wage variability and job losses, as well at redistributing income towards disadvantaged individuals. The balance of costs and benefits of various policies should determine their character and intensity.

This paper studies interactions between labor markets and public debt accumulation. Labor market policies have no direct impact on government deficits if their budget is balanced, i.e. if the revenue of labor taxes is used to finance unemployment and employment subsidies. But to the extent that interfering with labor markets reduces aggregate employment and productivity, it will be harder for policymakers to address risk and distribution issues when those effects are more detrimental. One source of variation in the affordability of labor market policies is the need to service public debt, originating from previous policy choices. When public debt is low, higher unemployment and lower (or expensively subsidized, or misallocated due to EPL) employment may appear to be an acceptable price for desirable redistribution of risk and resources. The same combination, however, may be out of reach when tax revenue has to be tasked to the purpose of servicing or reducing debt: as even budget-balanced labor market policies reduce employment and output (if not welfare), they decrease the denominator of public debt/GDP ratios, increase their growth rates, and endanger the sustainability of public finances.

Section 1 outlines in some more detail these theoretical considerations in the context of a brief review of related strands of literature. Aiming to characterize the empirical menu of policy choices and policy consequences in the aftermath of the, Section 2 analyzes empirical relationships between public finance indicators and labor market policies and outcomes in the aftermath of the 1970s labor market unrest and oil shocks, when unemployment and public debt both rose more or less persistently in many advanced countries. The concluding Section 3 outlines what this paper's perspective and empirical results imply for the evolution of labor market policies and outcomes in the aftermath of large public debt accumulation during the 2008-09 crisis, and for further research.

1. Labor market and fiscal policies

In the recent financial crisis fiscal deficits have played a major role, both as a result of tax revenue loss, and of policy responses. Government deficits are beneficial in a crisis because, unlike many workers and – when financial markets malfunction – most firms as well, governments can borrow to smooth out the implications of temporary shocks. Within government budgets, policies targeted to the labor market have been prominent in many countries. In Germany and in Italy, the *Kurzarbeit* and *Cassa integrazione guadagni in deroga* short-work and temporary layoff programs have subsidized permanent employment relationships. In other countries, the crisis triggered large expenditures on income and job-search support to permanently displaced workers.

It may be too early to assess which of these policy responses was more appropriate, since the answer depends on whether the shock will prove to be just a manifestation of financial difficulties and temporary aggregate demand shortages, or will instead call for permanent restructuring and reallocation. It is instead already possible, and useful, to characterize the longer-term motivations and implications of different labor market policy instruments for labor market and debt outcomes.

1.1 Labor market policies

Just like the aggregate balance of taxes and subsidies can smooth aggregate demand shocks in labor and product markets, the distribution of taxes and subsidies across workers and households can smooth consumption over individual labor market shocks. A large literature (reviewed in e.g. Bertola, 2009) studies the character and intensity of institutional influences on labor market outcomes, which differ substantially across countries. Efficient allocation and flexible reallocation of employment usually requires effort by workers, for whom changing jobs is costly. In a *laissez faire* labor markets such efforts need to be prompted by wage variability across more or less productive workers and jobs. Since it is difficult and important for individuals to be sheltered from excesses of such variability, labor-market institutions aim at reducing *ex post* inequality of outcomes for *ex ante* similar individuals, and/or at redistributing resources across different individuals. At the same time, they all affect aggregate employment and output negatively.

Unemployment insurance makes it less painful to become and remain unemployed, but unavoidably reduces workers' incentives to avoid job loss and seek new jobs. Like any other subsidy to non-employed individuals (such as pensions, on which see Disney, 2004), unemployment subsidies need to be funded by taxing income, and labor taxation reduces labor force participation and employment. Employment protection legislation reduces the likelihood of job loss for uninsured workers, but shifts the costs of adjustment to employers, and reduces total production as employment stability comes at the price not only of less job destruction but also of less creation of more productive jobs. To

reconcile flexible reallocation and work incentives with the objective of sheltering labor incomes from risk, public training programs, in-work subsidies, and other active labor market policies combine forms of income support with measures meant to ensure that labor is not idle (as it might in a simple unemployment benefit program) or employed in low-productivity jobs (as employment protection tends to imply). Such policies can combine “security” with “efficiency”, but they are expensive. This third “fiscal” aspect of the labor market policy trilemma explains why the Danish flexicurity approach yields high levels of employment and security at the same time as it draws some 5% of GDP into funding of labor market policies.

As Table 1 shows, different countries choose different combinations of these policies, and feature different levels of wage inequality. The grouping of countries in the Table follows the standard Esping-Andersen (1999) classification, which reflects underlying social and political determinants of the desirability of labor market intervention, and of the relative costs of various instruments in terms of tax collection and administration aspects. In Table 2 we see that the unemployment and employment rates implied by labor market policy models are also different.

Since many labor market policy instruments are fiscal in nature, and all have fiscal implications through their employment and effects, it is natural to wonder how policies and outcomes may be shaped by aggregate government budget developments.

1.2 Public debt

High unemployment and/or inefficient employment may or may not be politically acceptable and generously subsidized, depending on individual countries’ political and economic circumstances. If the same countries are burdened by high public debt, however, their politico-economic equilibrium can only be shifted towards less intrusive labor market policies.

Public debt, of course, is not a completely natural phenomenon. Its accumulation reflects policy choices as well as past shocks. Government deficits can be an effective stabilization tool in the face of macroeconomic fluctuations. For debt financing of government expenditure to matter at all, of course, the financial link between current and future payments of taxes must be imperfect (so that “Ricardian equivalence” fails), because private agents, unlike governments, are finitely lived — or because, as the recent crisis made abundantly clear, financial markets are far from perfect even in the shorter run. Changes in deficits, aimed at offsetting the shocks to which the economy would respond improperly, make it possible for fiscal policy to exert its desirable stabilizing role.

In the absence of further unexpected shocks, further deficit spending does not sustain growth, and the path of debt would be unsustainable if debt service were met by persistent and growing deficits. Since the average level of deficits and the economy’s nominal growth determine the dynamics of the

public debt/output ratio, the stabilization of that ratio requires adjustment of taxes and expenditures.

Bacchiocchi, Borghi, and Missale (2009) model the constraints imposed on various aspects of fiscal policy by past debt accumulation, and document that within the high-debt group of observations in their sample high debt/GDP ratios are associated with lower public investment, lower public educational expenditure, and other policy indicators. Debt sustainability concerns, in fact, are stronger when high public debt/GDP may trigger self-fulfilling expectations of a debt crisis. When public debt is denominated in terms of the country's currency, it may be reduced in real terms by unexpected inflation: but if incentives to inflate are not kept in check by credibility, they will engender inflation expectations, and the high real interest rates that realize if inflation does not materialize will depress output and boost debt/GDP ratios, precipitating the crisis (Dornbusch, 1989). This mechanism may work through labor market as well as through financial market channels. Hence, high debt and poor macroeconomic policy credibility can trigger a vicious circle of fast debt growth, low employment, and slow income growth when real wages are rigid, so that expected inflation also implies higher wage demands and, if monetary does not accommodate expectations, high realized interest rates.

Previous research has explored the relevance of nonlinearities whereby the danger of such spirals affects realized growth rates more strongly when debt/GDP ratios exceed certain thresholds, as well as the empirical relevance of formal deficit and debt limits such as those enshrined in the EU's Stability and Growth Pact (Galí and Perotti, 2005). Reinhart and Rogoff (2010) find in country panel and long-history data that debt/GDP ratios over 90% are associated with significantly lower growth rates than in lower debt/GDP groups. This may reflect the constraints, modeled and documented by Bacchiocchi et al (2010), imposed by high debt repayment burdens on such growth-enhancing policies as educational expenditures. It may also however be a spurious reflection of the fact that high indebtedness and slow growth are both jointly caused by negative shocks, such as financial crises.

Existing work has also studied the character and effectiveness of different "fiscal consolidation" programs in the face of such concerns (Alesina and Perotti, 1996; Guichard et al, 2007). Deficit reduction is attempted more often by increasing taxes than by reducing expenditure, but is more likely to be permanent in the latter case; empirically, inflation is not an important factor of public debt reduction in advanced countries (Giannitsarou and Scott, 2006). More detailed evidence suggests that stabilization attempts tend to be accompanied by a cluster of reforms (Hauptmeier et al, 2007). Tagkalakis (2009) documents an interesting association between some structural reforms (such as a reduction of unemployment benefit replacement rate) and the incidence and success rate

(defined as reductions by more than 1.5% of the deficit, with primary surplus persisting for 3 years) of fiscal adjustments.

While all these empirical results have to be qualified by the rather small amount of information available on relatively rare and long-lived public finance problems (at least in advanced countries), the lower likelihood of fiscal adjustment success when taxes are the instrument of deficit reduction may reflect the type of negative feedback on which this paper focuses. If expenditure is rigid, and higher taxes decrease employment, a tax-based debt stabilization can sow the seeds of its own demise. Of course, the policy mix adopted by a specific country and its effects are shaped by many factors, and a particularly relevant one may be the impact of economic integration on a National government's tax powers. In an open economy, the tax burden has to be on relatively immobile factors, such as labor, and implies larger employment effects if, as is likely, labor demand is more elastic in more open economies (Andersen and Skaksen, 2007; Bertola, 2006).

2. Labor markets and public debt in the late 20th century

This section proceeds to examine past experiences in a set of standard labor market policy and outcome indicators, merged with equally standard public debt and deficit indicators (see the Data Appendix). In what follows, empirical relationships are illustrated by simple data plots over the whole available sample; analyzed by formal regressions on the post-1980 sample with complete information about both public finance and labor market indicators; and interpreted, on a case-study basis, examining specific countries' trajectories along the public debt and labor market spectrum.

2.1 Labor market policies and outcomes

In each of Figures 1-8 the left-hand side panel plots averages of 5 year periods (see the Appendix) of the variables considered, while the right-hand side one removes the influence of permanent country-specific characteristics (such as those that determine membership in the groups examined in Tables 1 and 2) by showing deviations of the same variables from their mean across all observations available for each country.

Figure 1 shows that unemployment indeed tends to be high in countries and periods where unemployment insurance benefits are generous, and that the relationship is stronger along each country's time trajectory (shaped, among other things, by public debt accumulation or decumulation). Symmetrically, in Figure 2 labor tax rates are negatively related to employment rates; in figures not shown, the relationship between labor taxation and unemployment (as opposed to non-employment) is more nuanced, as theory predicts since taxes may or may not affect the difference between the returns to employment and those to job-seeking (Daveri and Tabellini, 2000; Pissarides, 1998). In Figure 3 we see that intense Active Labor Market Policies expenditure is

significantly (albeit expensively) associated with lower unemployment; the relationship between Active Labor Market Policies and the Employment rate (not shown) is symmetrically positive.

Tables 3 and 4 document these associations more formally, assessing the statistical association of each policy indicator to both employment and unemployment, and in terms of multivariate regressions (with and without country and time effects) as well as of two-way associations of the type displayed in Figures 1 and 2. Of course least-square regressions, even when they include a variety of policy indicators and control for unobserved characteristics, need not reliably estimate the effects of policies. The coefficient estimates may in fact reflect spuriously other factors that, while unobservable, may plausibly be related both to labor market outcomes and to labor market policies. For example, unemployment may be high and unemployment insurance generous not just because the latter causes the former (as it undoubtedly does in theory to some extent), but also because policymakers increase the generosity of unemployment insurance at times when, for some other reason such as negative labor demand shocks wage rigidity, unemployment is high. Conversely, the negative employment effects of labor taxation may be less apparent in the data than in theory if taxes are high in countries where employment is, for other reasons, high and/or insensitive to taxation. Moreover, separate measurement of employment and unemployment rates is conceptually difficult, and the “willingness to work” criteria underlying the harmonized unemployment rates used in these regressions may in practice have different implications in countries with different cultures and different benefits schemes.

With these caveats in mind, it is interesting to find that unemployment insurance generosity has the theoretically expected positive coefficient for unemployment in all columns of Table 3, but in Table 4 it is negatively associated with employment (as expected) only in multivariate regressions that control for other policies and for country effects (time effects are not significant). Labor tax rates display a consistently negative association with employment rates, which is weakened by inclusion of country and time effects, indicating that labor taxation in the data tend to move in parallel over time. It is also found to be positively associated with unemployment, and more significantly so than unemployment insurance generosity. This would not be consistent with simple theoretical considerations if the latter indicator measured exhaustively and precisely the job-search and offer-acceptance effects it is meant to pick up, but it is of course difficult for the data to distinguish those effects from those (on labor demand and labor force participation) that tax rates are supposed to measure. The active labor market policy indicator always displays an unsurprisingly negative associations with unemployment, and positive associations with employment.

2.2 Public debt and labor market outcomes

Figure 4 and 5 plot the relationship between a conventional definition of public debt/GDP ratios and unemployment or employment rates (see the Data Appendix for definitions and sources). Theory predicts that when debt is high employment should be low if debt calls for high labor taxes, and that unemployment should be low if debt calls for less generous subsidies. The evidence may be driven by such influences of high debt on labor market policies, but may also reflect other factors shaping either or both of the variables on the axes of the figures.

On balance, and on a 5-year average basis that smooth out most cyclical fluctuations, high debt is indeed associated negatively with employment (more or less strongly, depending on whether country specific means are subtracted). It is a positively associated with unemployment. In terms of the simple theoretical considerations above, this could be taken to indicate that countries in the sample have responded to persistently high unemployment with debt financing of unemployment subsidies, and/or have met debt financing needs more by raising taxes (implying lower employment) than by reducing unemployment insurance and other social expenditures (which would increase employment, and lower unemployment). Of course, high unemployment and low employment may instead be jointly caused by the same economic problems that lead to debt accumulation. For this reason it will be important and interesting below to try and trace the sources of poor labor market performance in policies.

The possible ‘threshold’ character of sustainability concerns suggests that the relationship between public debt levels and policy may be different at different debt levels. Table 5 reports unemployment and employment rates in subsamples of yearly observations with different debt/income ratios. Labor market performance deteriorates steadily as debt increases to 90% of GDP, and does not deteriorate further beyond that. The change in the relationship happens to occur around the same 90% that Reinhart and Rogoff (2010) argue may trigger sharply slower growth. The direction of the nonlinearity, however, is the opposite one here. While growth may be negatively related to public debt only when public debt is very high, labor market outcomes are negatively related to public debt only when public debt is low, or moderately high. A more striking pattern is that of labor market outcome variability within each indebtedness group: unemployment rates are most variable at intermediate levels of debt, reflecting the variety of experiences across countries in that case (where debt may be increasing or decreasing); it is highest for employment rates for very high debt levels, suggesting that different countries have reacted differently to potentially unsustainable debt accumulation.

The reasoning that motivates this paper suggests that public debt (while very visible) need not be the most relevant measure of fiscal constraints on labor market policies. The statistics and figures shown

so far were based on the OECD “Gross government financial liabilities” measure. The same source also provides a “Gross government financial assets” measure (not as comparably defined across countries, e.g. because of differences in the importance and treatment of funded public pension funds and national railway debt), as well as the corresponding series of gross and net interest payments by government entities.

Tables 6 and 7 report four sets of regressions relating unemployment and employment rates not only to (gross) public debt, but also net public debt series obtained by subtracting government financial assets from it, and of gross and net government interest payments (all normalized by GDP and expressed in percentage points). The data are averages over the five-year (or shorter in the early 2000s) periods where labor market policy indicators, analyzed in the next subsection, are available from the data sources listed in the Data Appendix, from 1980-84 to 2000-2003.

In all cases, public debt and debt service indicators are significantly associated with unfavorable labor market outcomes. Across the various measures of public finance funding problems, the most significant one appears to be “Public interest payments (net),” which may indeed represent most closely to the constraint imposed on labor market policies by public finance considerations. Its theoretical relevance and empirical usefulness are also strengthened by the fact that, unlike debt stock measures, it captures cross-country differences and time-series dynamics of interest rates as well as of debt stocks. Country dummies are strongly significant in all regression, reflecting the permanent employment and unemployment rate differences that may be partly attributed to the Welfare State policy configuration differences discussed and documented above. Period dummies are not significant, indicating that the variables did not move in parallel across countries over time. In regressions not reported, cross-country differences in the slope coefficients of public finance indicators are neither individually nor jointly significant.

The regressions also allow for a nonlinear association between unemployment or unemployment rates and public finance indicators. Consistently with the simpler statistics in Table 5, non-linear terms are either insignificant, or their sign is opposite that of the corresponding linear term. This pattern is to a some extent driven by the presence in the sample of countries like Japan, with relatively low unemployment and very high debt (but low interest rate) for much of the sample. But controlling for country effects, or excluding Japan, does not remove evidence that the empirical association between public indebtedness and poor labor market performance is less pronounced when public finances are in very bad shape. In regressions not reported, when the linear and quadratic coefficients are allowed to differ across countries differences the slope effects are usually insignificant, and always completely insignificant as a group. While management of critical debt situations may well differ from that of more sustainable circumstances, it presumably does so

differently, across countries and periods, in ways that are impossible to detect reliably in available data.

2.3 Public finance problems and labor market policies

When confronted by past debt accumulation, policy-makers may choose simply to service existing debt stocks, or to reduce it more or less sharply. Governments' power to tax can back very high debt level but, as discussed above, taxation generally damage effort incentives and production, especially in open economies where private agents can react to taxation by withdrawing from their country's (taxable) markets to other countries' markets, rather than to autarky. And since government have the power to renege their debt obligations, by outright default or inflation, the temptation to do so can trigger sustainability crises.

While the intergenerational and macroeconomic implications of different debt paths and stabilization strategies are very different, they all have implications for the feasibility and desirability of labor market policies. This makes it interesting to try and detect the relationships between public finance problems and labor market policies that may mediate the association, discussed above, of the former to unemployment and employment rates.

As regards the overall empirical relationship between public debt and labor market policies, Figures 6-8 show that, across all countries and periods, high debt is associated to higher labor taxes, but also to more generous unemployment insurance provisions (when country means are subtracted). The association between debt and Active Labor Market Policies is moderately negative: the countries that rely on such instruments may also be those that experienced relatively modest debt accumulations over the sample period, and/or (within country-specific trajectories) high debt induced moderation in use of expensive Active Labor Market Policies.

Over the rather short period for which data are available, public debt/output ratios display no tendency to mean-revert: changes in that ratio are completely unrelated to their level (consistently with the evidence in, e.g., Faraglia, Marcet, and Scott, 2008). The same, however, is not true of the ratio of net (or, indeed, gross) interest payments to GDP, a more theoretically appropriate measure of public finance sustainability problems. One way to assess the relationship between debt stabilization and labor market policies is to inspect how the intensity of debt service stabilization tendencies depends on whether labor taxes, unemployment insurance generosity, and active labor market policies are high or low. Since each instrument is used differently in different countries, "high" and "low" should be defined in relative terms within each country's trajectory. Table 8 reports regressions of the change in debt service on current debt service level. Over the whole sample of 5-year averages, a significant mean-reverting tendency is observed. When the sample is split across observations for which each policy instrument is above or below its country-specific median value,

mean reversion is significant when labor taxes are high, but also when unemployment insurance and active labor market policies are generous. This finding may indicate that (labor) tax-based reforms played a role in country-specific debt dynamics, while other policy instruments are not as sensibly related to public finance stabilization concerns. But the complicated pattern of signs and significance across individual policy indicators, and the joint significance of all three indicators as explanatory variables for employment and unemployment in Tables 4 and 5, suggest that for the purpose of controlling debt dynamics different countries chose different combinations of policy changes, driven by international economic integration and by political considerations as well as by policy traditions. Tables 9-11 report the coefficients detected by regression of labor market policy indicators on "Public interest payments (net)," the most theoretically sound and empirically useful measure of public finance situations among those considered in Tables 6 and 7, and on its interactions with Welfare State dummies that sort countries across the groups inspected in Table 1 (the statistics refer to the size and significance of intercepts and slopes deviations for the other groups with respect to Mediterranean countries, the reference group).

The results of this exploration can be only suggestive, of course, but do suggest that public debt developments were a significant determinant of heterogeneous policy patterns and reforms. In Table 9, the generosity of unemployment insurance systems is found to be (insignificantly) lower when and where debt service is more burdensome. This finding is not driven by country or time effects (the latter in fact strengthen the negative coefficient). It indicates that the positive association detected above between public debt and unemployment does not work through this (admittedly imprecise) indicator: when in debt, countries typically do reduce the generosity of unemployment benefits, and the fact that unemployment is nevertheless higher reflects other factors. The Welfare State level dummies have the expected signs; more interestingly, the Nordic and Continental countries that feature highly generous unemployment insurance also display a significant tendency to increase them in response to higher debt service (and other underlying problems). Controlling for country dummies removes all significance from those group-slope effects, however, indicating that the data do not convey much information about the relationship between this particular labor market indicator and policy reactions to public indebtedness.

The messages of Table 10 and Table 11, where a similar exploration is carried out for the other labor policies, is similarly intriguing and imprecise. Labor taxes are robustly and positively related to Public debt interest (net), which may be the reason underlying the negative relationship between high debt and low employment. It is again possible to detect a positive level effect in Nordic and Continental countries, which also appear to increase taxes less in response to public finance problems. Again, controlling for country dummies suffices to make all coefficients individually insignificant (while time effects, here and in the previous table, are not significant). The pattern of signs and significance is

similar for active labor market policies, that are significantly reduced everywhere in response to higher Public interest payments (consistently with the overall relationship detected above between public debt and unfavorable employment and unemployment developments). The response differs significantly across Welfare State groups if the level is allowed to differ only across those groups; when country dummies absorb most of the variation, only the (negative) slope of Nordic countries remains significant.

2.4 Two country stories

It is unsurprisingly difficult, as illustrated by the effect of country dummies in the regressions above, to detect in limited data strong empirical regularities. Policymaker choices along the public finance and labor market menu of rocks and hard places are simply too heterogeneous and variable to be characterized simply. The data do offer intriguing indications of empirical relevance for the channels explored in this paper, however. To highlight them further, it is interesting to examine the policy trajectories followed by specific countries.

Figure 9a plots the time path of net government interest payments and deficits, in percent of GDP, for Sweden and the UK. Debt is always higher in Sweden than in the UK (where it did however reach 72% of GDP in 1971, before the start of the sample plotted). The early 1990s crisis triggered an increase in the government deficit in both countries, but much more strongly in Sweden — where, as shown in Figure 9b, unemployment rose from below 3% to the same 10% observed in the UK, and employment declined by about the same amount from more than 70%.

Figures 10c and 10d illustrate how these developments may be traced to the dynamics of labor market policy indicators. Unemployment insurance generosity, labor taxation, and Active Labor Market Policies are always higher in Sweden than in the UK (where they decline steadily over the observation period). In Sweden, generous unemployment insurance and a decline in labor taxes appear to contribute to debt accumulation in the crisis, and the subsequent decline of both of these indicators and (especially) of Active Labor Market Policies expenditure play a role, alongside the cyclical upswing, in the decline of public debt in the latter part of the period.

And Figure 9e shows that this response, while certainly well advised, was not without cost in terms of the wage inequality that labor market policies are meant to keep under control. In response to debt burden, the United Kingdom achieved low unemployment and high employment by accepting higher wage inequality in the 1980s. Sweden followed a similar path (around its different labor market configuration parameters) during the 1990s.

3 Implications for future policy and research

In the Swedish and UK experience, reform trends and their inequality implications were arguably accelerated in the aftermath of debt accumulation triggered by the public deficit implications of cyclical crises. Other countries with different traditions chose yet other reform paths in response to their own macroeconomic and public finance problems. Italy, for example, relied not only on partial flexibility measures but also on coordinated wage bargaining in order to stabilize debt dynamics on the path to EMU membership. While sources of labor market and public debt problems differ across countries and periods in ways that make it difficult to obtain clear empirical results, the mechanism linking the two should always and everywhere be similar. Fiscal and non-fiscal policy instruments aimed at shaping labor market outcomes are constrained by public funding difficulties. And use of fiscal instruments to shape employment and unemployment may on the one hand worsen public deficits, on the other and decreases employment and production in ways that endanger public debt sustainability.

In the 1970s and 1980s, labor market problems translated into public finance problems in countries where policymakers attempted to reduce the unemployment induced by wage hikes by such as early retirement and public employment policies. Such attempts were misguided in that structural labor market problems should be addressed by structural policies, aimed at reconciling the “security”, “efficiency”, and “fiscal” horns of the policy trilemma outlined in Section 2. Theory and past evidence are relevant to the possible consequences of the 2008-09 crisis, triggered perhaps by energy prices but certainly by financial market shocks, like the Swedish and Finnish crises of the 1990s, rather than by labor market problem as was the case in other European countries in the 1970s.

Since 2007, public debt/GDP ratios have increased by 75 percent in countries that experienced systemic financial crisis, and by an average of 20 percent in other countries (Reinhart and Rogoff, 2010). There are large differences across countries in the severity of the crisis and the intensity of fiscal responses, and the financial character of macroeconomic trouble – while close to that of Sweden’s experience in the 1990s – is not the same as that of 1970s debt accumulation in most developed countries, which was rooted in factor price hikes. In all countries and regardless of the source of macroeconomic problems, however, the need to service and stabilize debt undoubtedly will force policymakers to revise their priorities in the labor market as well as in other policy fields. Employment declines and unemployment increases occur late in the crisis, and are certainly more socially and politically costly than the preceding crashes in asset prices, and in production and profits. The extent to which the immediate relief of cyclical unemployment afforded by aggregate demand

stimulation should be traded off other policy objective depends on individual countries' characteristics and political objectives. In all countries, however, policy responses to all aspects of the crisis can engender persistent future problems, because fiscal and monetary reactions to the crisis bequeath large public debts and looming inflation expectations to future policymakers.

In the aftermath of the crisis, it will not be easy to absorb the inheritance of emergency without hampering labor market performance. Should expected and actual inflation materialize in the crisis's aftermath, we may witness again the same labor market mechanics as were observed in the early 1980s (Dornbusch, 1989), whereby debt stabilization would increase unemployment in the presence of rigid inflation expectations. To the extent that international economic integration and supranational constraints will continue to shape fiscal and monetary policies, however, structural reform reactions will be more likely responses to debt sustainability problems, at least in Europe (Bean, 1998; Belke, Herz, and Vogel, 2007). As pointed out by Patrick Honohan's discussion of Dornbusch (1989), Ireland's failed stabilization in the early 1980s was due to that country's decision to increase the generosity of its unemployment insurance subsidies "in an attempt to shelter the worst off from the fiscal adjustment" and to its failure to implement real wage rate reductions in the public service. As debt accumulation will eventually force speedier labor market deregulation in integrated economies, this paper's theoretical considerations and examination of past empirical patterns (as well as Ireland's more recent and likely future experience) suggest that policymakers should exercise discretionary budget policy more cautiously if they do not like the ultimate implications of debt accumulation for other policies' ability to shape labor market outcomes.

As to future research, the debt accumulation and decumulation patterns treated in this paper as a forcing variable for labor market policies are, of course, themselves endogenous to policy choices. The dynamics of debt accumulation and decumulation reflect policymakers' choices between large swings, aimed at macroeconomic stabilization in the face of exogenous shocks, and some degree of reversion meant to smooth primary fiscal balances. These policy choices presumably reflect the balance of a variety of different objectives and constraints, and certainly have different implications for intergenerational distribution. Over time and across countries, factors other than labor market policies shape both unemployment and debt dynamics. The public debts of late 20th century developed countries were rooted in policies that were chosen in response, among other things, to labor markets' poor performance. Hence, public debt service is certainly not completely suitable for purposes of assessing the sources and consequences of labor market policy choices, along the lines of Bertola and Lo Prete's (2010) analysis of globalization trends and country characteristics as drivers

of policies relevant to financial development. In future work, it would be interesting to model labor market and public finance policy decisions jointly, possibly on the basis of welfare optimization and distortion minimization criteria for debt management, in an incomplete-markets environment (Missale, 1999; Faraglia, Marcet, and Scott, 2008).

Such efforts may be fruitful because, as this paper has shown, public debt and public finance dynamics do empirically prove to be strongly associated to changes of labor market policies and outcomes. Data scarcity makes it impossible to estimate more detailed and robust patterns of results, because government policies and deficits reflect a large variety of circumstances, some politically determined, and some determined outside the country, such as variation in global interest rates or, perhaps, the Stability and Growth Path's constraints. Still, the relevance of the institutional and political characteristics captured by welfare state groupings of countries indicates that politico-economic interactions may well be relevant, and that the policy implications of financial market incompleteness should take labor income distribution issues into account.

Data appendix

Cross-country comparable long time series for public finance indicators are available from the OECD Employment Outlook data base (other sources do not cover periods before 1990) for all or most of the 1980-2003 period for the following countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal (only since 1995), Spain (only since 1987), Sweden, Switzerland, United Kingdom United States. Labor market indicators are drawn from various other OECD databases (see below) for the same countries. Greece, in news at the time of writing for its poor deficit reporting practices, is excluded from the sample by unavailability of both public finance and labor market policy indicators.

Figures and summary statistics tables use 1970-1974 and 1975-1979 periods where available. For most countries and labor market policy indicators, however, only most years since 1980 are available. Five-year averages of those data are the units of observation in all regressions. The last period is the average of 2000-03.

Public finance indicator definitions:

Public debt is measured as “General government gross financial liabilities”: the debt and other liabilities (short and long-term) of all the institutions in the general government sector, defined by ESA95/SNA93, subject to data availability. For the United States, Flow of Funds estimates are used, which value debt at face value. The gross data are consolidated within and between the sub-sectors of the general government sector, national sources permitting.

Public debt (net) is measured as “General government net financial liabilities”: the gross financial liabilities of the general government sector less the financial assets of the general government sector. Such assets may be cash, bank deposits, loans to the private sector, participation in private sector companies, holdings in public corporations or foreign exchange reserves, depending on the institutional structure of the country concerned and data availability. With respect to Japan, data have recently been revised back to 1980 in a retroactive application of the current benchmark of 2000 prices. The revisions affect data prior to 1997.

Public interest payments is “General government net debt interest payments” and *Public interest payments (net)* is “General government net debt interest payments.”

Government deficit is measured as “Government net lending:” general government current tax and non-tax receipts less general government total outlays.

See http://www.oecd.org/document/25/0,3343,en_2649_34109_33702745_1_1_1_1,00.html for further details on definitions and cross-country comparability issues.

Labor market policy indicators:

Labor tax rate is measured as the “Total tax wedge (average rate in %), single at 100% of average earnings, no child” available for the 1979-2003 period (with some missing values) from OECD, *Taxing Wages 2007*.

Unemployment insurance generosity is the OECD summary measure of benefit entitlements, available for the 1961-2005 period from OECD, Tax-Benefit Models, www.oecd.org/els/social/workincentives.

Active labor market policies is the percent ratio of spending per unemployed person to GDP per capita is taken from the Bassanini and Duval (2006) dataset.

Labor market performance indicators:

Unemployment rate of working age (15-64) population, from the Bassanini and Duval (2006) dataset.

Employment rate of working age population, computed from OECD Economic Outlook data.

Wage inequality is measured in terms of ratios of median wage to the 10th percentile of the wage distribution, and of its 90th percentile to the 10th percentile, from the OECD Trends in Earnings Dispersion database.

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	Unempl. insurance generosity	Labor tax rate	Active Labor Market Policy (a)	Wage inequality (b)
Nordic	33.6	45.1	52.5	2.2
Anglo-Saxon	18.8	30.9	12.0	3.8
Continental	37.7	47.7	33.5	2.9
Mediterranean	21.5	41.6	11.4	2.9

Table 1. Labor market policies and wage inequality in different groups of countries.

Nordic: Denmark, Finland, Norway, Sweden; Anglo-Saxon: Australia, Canada, Ireland, United Kingdom, United States; Continental: Austria, Belgium, France, Germany, Netherlands; Mediterranean: Italy, Portugal, Spain. (a) Expenditure per unemployed person as percent of per capita GDP. (b) Ratio of 90th to 10th percentile.

	Unemployment rate		Employment rate	
	mean	<i>Std. dev.</i>	mean	<i>std. dev.</i>
Nordic	5.4	3.4	71.1	4.9
Anglo-Saxon	7.2	2.3	66.2	4.5
Continental	6.5	3.4	65.4	5.0
Mediterranean	11.2	5.2	56.6	6.6

Table 2. Level and variability of unemployment and employment in different groups of countries.

Country group definitions as in Table 1.

Regressions: Unemployment rate						
Unemployment insurance generosity	0.013 <i>0.47</i>			0.036 <i>1.22</i>	0.058 <i>1.42</i>	0.050 <i>1.37</i>
Labor tax rate		0.113 <i>3.92</i>		0.151 <i>5.79</i>	0.269 <i>2.60</i>	0.217 <i>1.86</i>
Active labor market policies			-0.055 <i>-4.35</i>	-0.080 <i>-4.10</i>	-0.057 <i>-4.61</i>	-0.055 <i>-4.49</i>
Country effects	No	No	No	No	Yes	Yes
Period effects	No	No	No	No	No	Yes
R ²	0.002	0.089	0.143	0.331	0.871	0.899
N	70	70	70	70	70	70

Table 3. Regressions of unemployment rates on labor market policy indicators.

Observations are averages of yearly data for the countries and periods listed in the Data Appendix. All regressions include a constant (not shown); t statistics based on robust standard errors in italics below the coefficients.

Regressions: Employment rate						
Unemp. insurance generosity	0.099 <i>1.53</i>			0.110 <i>1.71</i>	-0.108 <i>-1.87</i>	-0.146 <i>-2.91</i>
Labor tax rate		-0.226 <i>-2.50</i>		-0.374 <i>-4.16</i>	-0.201 <i>-1.35</i>	-0.092 <i>-0.76</i>
Active labor market policies			0.104 <i>2.96</i>	0.119 <i>3.25</i>	0.091 <i>5.05</i>	0.092 <i>7.44</i>
Country effects	No	No	No	No	Yes	Yes
Period effects	No	No	No	No	No	Yes
R ²	0.030	0.084	0.122	0.312	0.944	0.966
N	70	70	70	70	70	70

Table 4. Regressions of employment rate on labor market policy indicators.

Observations are averages of yearly data for the countries and periods listed in the Data Appendix. All regressions include a constant (not shown); t statistics based on robust standard errors in italics below the coefficients.

Public Debt/GDP	Unemployment rate		Employment rate	
	mean	std. dev.	mean	std. dev.
0-30%	4.1	2.4	69.9	2.8
30-60%	5.9	3.5	67.7	6.8
60-90%	7.5	4.3	66.3	6.7
90-120%	9.0	2.6	61.7	7.1
>120%	9.0	2.4	59.6	7.9

Table 5. Unemployment and employment at different public debt/GDP ratios.

Yearly data.

Regressions: Unemployment rate				
Public debt	0.026 <i>2.10</i>	0.087 <i>1.64</i>	0.182 <i>3.93</i>	0.204 <i>3.81</i>
Public debt squared /100		-0.038 <i>-1.16</i>	-0.066 <i>-2.94</i>	-0.070 <i>-2.65</i>
Country effects	No	No	Yes	Yes
Period effects	No	No	No	Yes
R ²	0.037	0.047	0.856	0.901
N	70	70	70	70

Regressions: Unemployment rate				
Public debt (net)	0.029 <i>3.50</i>	0.028 <i>2.54</i>	0.043 <i>2.26</i>	0.027 <i>1.21</i>
Public debt (net) squared /100		0.001 <i>0.13</i>	0.006 <i>0.43</i>	0.019 <i>0.83</i>
Country effects	No	No	Yes	Yes
Period effects	No	No	No	Yes
R ²	0.081	0.081	0.800	0.839
N	67	67	67	67

Regressions: Unemployment rate				
Public interest payments	0.544 <i>5.34</i>	1.370 <i>2.39</i>	2.323 <i>3.77</i>	2.613 <i>3.67</i>
Public interest payments, squared		-0.070 <i>-1.46</i>	-0.114 <i>-2.91</i>	-0.129 <i>-3.04</i>
Country effects	No	No	Yes	Yes
Period effects	No	No	No	Yes
R ²	0.117	0.131	0.878	0.886
N	70	70	70	70

Regressions: Unemployment rate				
Public interest payments (net)	0.554 <i>5.51</i>	0.743 <i>3.04</i>	1.846 <i>3.38</i>	1.744 <i>3.08</i>
Public interest payments (net), squared		-0.024 <i>-0.96</i>	-0.085 <i>-2.23</i>	-0.097 <i>-2.58</i>
Country effects	No	No	Yes	Yes
Period effects	No	No	No	Yes
R ²	0.157	0.163	0.865	0.877
N	70	70	70	70

Table 6. Regressions of unemployment rate on public finance indicators.

Observations are period averages of yearly data for the countries and periods listed in the Data Appendix. All regressions include a constant (not shown); t statistics based on robust standard errors in italics below the coefficients.

Regressions: Employment rate				
Public debt	-0.100 <i>-2.85</i>	-0.152 <i>-1.04</i>	-0.183 <i>-2.24</i>	-0.217 <i>-2.43</i>
Public debt, squared/100		0.032 <i>0.32</i>	0.076 <i>1.80</i>	0.081 <i>1.92</i>
Country effects	No	No	Yes	Yes
Period effects	No	No	No	Yes
R ²	0.126	0.128	0.922	0.951
N	70	70	70	70

Regressions: Employment rate				
Public debt (net)	-0.106 <i>-7.33</i>	-0.088 <i>-4.84</i>	-0.039 <i>-1.56</i>	-0.015 <i>-0.69</i>
Public debt (net), squared/100		-0.033 <i>-1.50</i>	0.009 <i>0.42</i>	-0.011 <i>-0.43</i>
Country effects	No	No	Yes	Yes
Period effects	No	No	No	Yes
R ²	0.293	0.304	0.898	0.928
N	67	67	67	67

Regressions: Employment rate				
Public interest payments	-1.429 <i>-4.23</i>	-2.764 <i>-1.83</i>	-2.933 <i>-3.32</i>	-2.485 <i>-2.06</i>
Public interest payments, squared		0.113 <i>0.95</i>	0.137 <i>2.63</i>	0.125 <i>1.89</i>
Country effects	No	No	Yes	Yes
Period effects	No	No	No	Yes
R ²	0.191	0.200	0.945	0.947
N	70	70	70	70

Regressions: Employment rate				
Public interest payments (net)	-1.587 <i>-7.53</i>	-1.429 <i>-3.29</i>	-1.923 <i>-2.35</i>	-1.631 <i>-1.84</i>
Public interest payments (net), squared		-0.020 <i>-0.49</i>	0.071 <i>1.31</i>	0.090 <i>1.62</i>
Country effects	No	No	Yes	Yes
Period effects	No	No	No	Yes
R ²	0.306	0.307	0.933	0.945
N	70	70	70	70

Table 7. Regressions of employment rate on public finance indicators.

Observations are period averages of yearly data for the countries and periods listed in the Data Appendix. All regressions include a constant (not shown); t statistics based on robust standard errors in italics below the coefficients.

Regressions: Change in Public interest payments (net)							
Public interest payments (net)		Labor tax rate		Unemployment ins. generosity		Active labor market policies	
		Low	High	Low	High	Low	High
	-0.149	-0.085	-0.188	-0.021	-0.219	-0.079	-0.202
	<i>-2.61</i>	<i>-0.94</i>	<i>-2.59</i>	<i>-0.19</i>	<i>-3.57</i>	<i>-0.82</i>	<i>-2.95</i>
R ²	0.124	0.047	0.193	0.002	0.329	0.028	0.275
N	50	20	30	22	28	25	25

Table 8. Regressions of changes in public debt service on levels of public debt service.

Observations are period averages of yearly data for the countries and periods listed in the Data Appendix.

Except in the first column, the sample is split according to whether each labor market policy indicator is observed above ("High") or below ("Low") its country-specific median level. All regressions include a constant (not shown); t statistics based on robust standard errors in italics below the coefficients.

Regressions: Unemployment insurance generosity							
Public interest payments (net) slope	-0.423 <i>-0.70</i>	-0.270 <i>-0.26</i>	-0.813 <i>-0.79</i>	-0.154 <i>-0.28</i>	-1.315 <i>-1.48</i>	-0.958 <i>-1.07</i>	-0.900 <i>-0.32</i>
Welfare State regimes, level effects:							
Nordic				14.938 <i>3.09</i>	9.425 <i>1.78</i>	9.850 <i>1.80</i>	
Anglo-Saxon				-3.860 <i>-1.07</i>	-1.043 <i>-0.19</i>	-2.139 <i>-0.37</i>	
Continental				15.166 <i>3.69</i>	5.521 <i>0.89</i>	5.028 <i>0.79</i>	
slope effects:							
Nordic					2.639 <i>2.08</i>	2.267 <i>1.69</i>	0.060 <i>0.02</i>
Anglo-Saxon					-1.567 <i>-1.27</i>	-1.484 <i>-1.06</i>	1.693 <i>0.60</i>
Continental					2.423 <i>2.33</i>	2.226 <i>2.08</i>	1.470 <i>0.53</i>
Country effects	No	Yes	Yes	No	No	No	Yes
Period effects	No	No	Yes	No	No	Yes	No
R ²	0.007	0.914	0.937	0.415	0.479	0.524	0.916
N	70	70	70	70	70	70	70

Table 9. Regressions of Unemployment insurance generosity on public finance and Welfare State indicators.

Country group definitions as in Table 1. Observations are period averages of yearly data for the countries and periods listed in the Data Appendix.

All regressions include a constant (not shown); t statistics based on robust standard errors in italics below the coefficients.

Regressions: Labor tax rate							
Public interest payments (net) slope	1.511 <i>3.70</i>	0.605 <i>2.28</i>	0.600 <i>1.86</i>	1.985 <i>8.63</i>	2.906 <i>6.47</i>	2.841 <i>7.12</i>	0.441 <i>1.58</i>
Welfare State regimes, level effects:							
Nordic				15.546 <i>9.19</i>	19.658 <i>8.58</i>	19.895 <i>8.53</i>	
Anglo-Saxon				-4.034 <i>-2.65</i>	-0.775 <i>-0.28</i>	-1.365 <i>-0.51</i>	
Continental				11.617 <i>7.72</i>	17.919 <i>6.16</i>	17.910 <i>6.15</i>	
slope effects:							
Nordic					-1.756 <i>-3.00</i>	-1.687 <i>-3.06</i>	0.511 <i>1.29</i>
Anglo-Saxon					-0.845 <i>-1.05</i>	-0.505 <i>-0.63</i>	0.646 <i>0.73</i>
Continental					-1.600 <i>-2.82</i>	-1.477 <i>-2.78</i>	-0.156 <i>-0.20</i>
Country effects	No	Yes	Yes	No	No	No	Yes
Period effects	No	No	Yes	No	No	Yes	No
R ²	0.167	0.970	0.971	0.806	0.842	0.855	0.970
N	70	70	70	70	70	70	70

Table 10. Regressions of Labor tax rate on public finance and Welfare State indicators.

Country group definitions as in Table 1. Observations are period averages of yearly data for the countries and periods listed in the Data Appendix. All regressions include a constant (not shown); t statistics based on robust standard errors in italics below the coefficients.

Regressions: Active labor market policies							
Public interest payments (net) slope	-2.415 <i>-2.14</i>	-4.454 <i>-2.35</i>	-5.653 <i>-2.82</i>	-1.237 <i>-1.73</i>	-2.114 <i>-4.08</i>	-1.882 <i>-3.24</i>	-1.058 <i>-1.04</i>
Welfare State regimes, level effects:							
Nordic				31.448 <i>3.19</i>	25.888 <i>3.14</i>	26.097 <i>3.24</i>	
Anglo-Saxon				-2.049 <i>-0.56</i>	3.165 <i>0.32</i>	1.731 <i>0.17</i>	
Continental				20.025 <i>3.44</i>	17.614 <i>1.46</i>	17.616 <i>1.45</i>	
slope effects:							
Nordic					3.777 <i>1.51</i>	3.628 <i>1.36</i>	-8.841 <i>-2.61</i>
Anglo-Saxon					-2.358 <i>-0.89</i>	-1.973 <i>-0.72</i>	0.937 <i>0.86</i>
Continental					0.667 <i>0.41</i>	0.521 <i>0.32</i>	-5.574 <i>-0.94</i>
Country effects	No	Yes	Yes	No	No	No	Yes
Period effects	No	No	Yes	No	No	Yes	No
R ²	0.063	0.734	0.743	0.338	0.364	0.372	0.754
N	70	70	70	70	70	70	70

Table 11. Regressions of Active labor market policies on public finance and Welfare State indicators.

Country group definitions as in Table 1. Observations are period averages of yearly data for the countries and periods listed in the Data Appendix. All regressions include a constant (not shown); t statistics based on robust standard errors in italics below the coefficients.

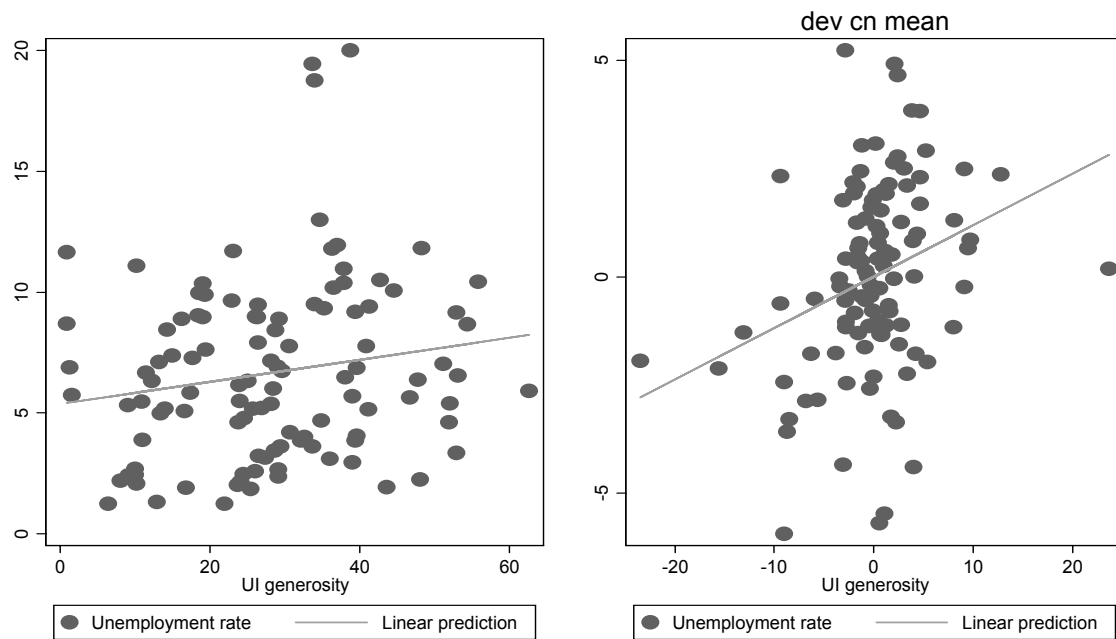


Figure 1. Unemployment rate and Unemployment Insurance generosity.

The left-hand side panel plots 5-year averages for the countries and periods listed in the Data Appendix, the right-hand side panel plots deviations from country means of the same observations.

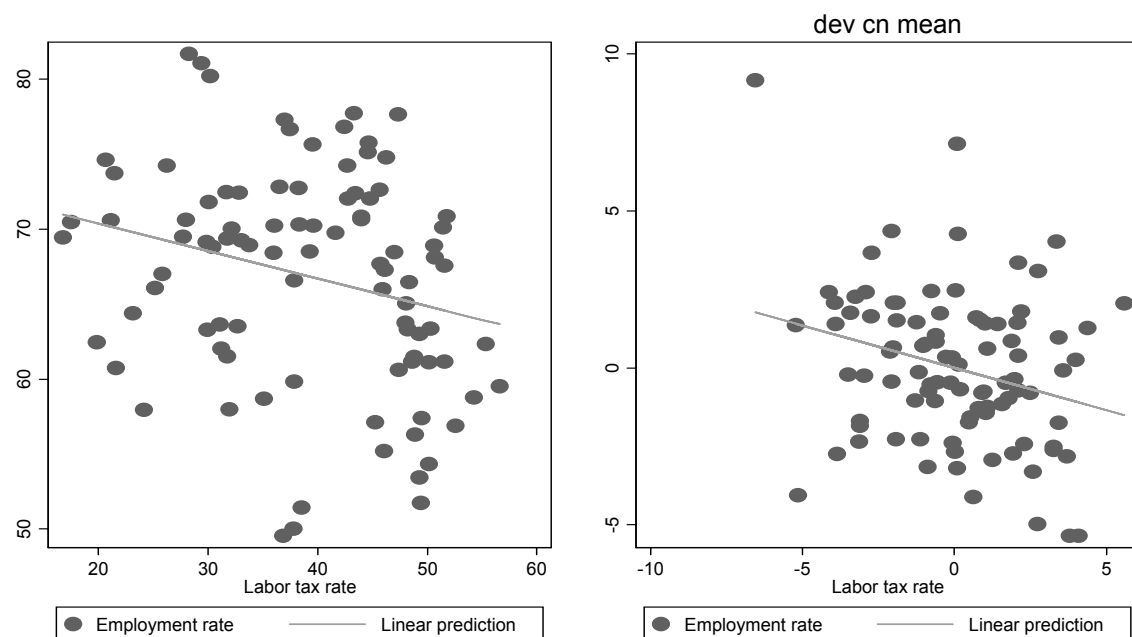


Figure 2. Employment rate and labor taxation.

The left-hand side panel plots 5-year averages for the countries and periods listed in the Data Appendix, the right-hand side panel plots deviations from country means of the same observations.

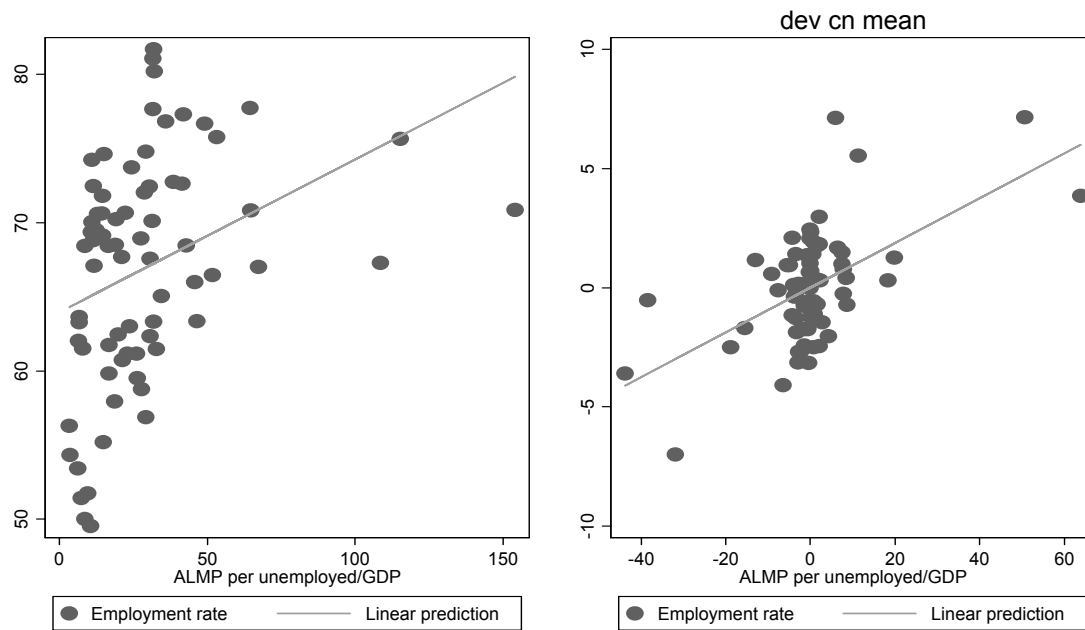


Figure 3. Unemployment rate and Active Labor Market Policies.

The left-hand side panel plots 5-year averages for the countries and periods listed in the Data Appendix, the right-hand side panel plots deviations from country means of the same observations.

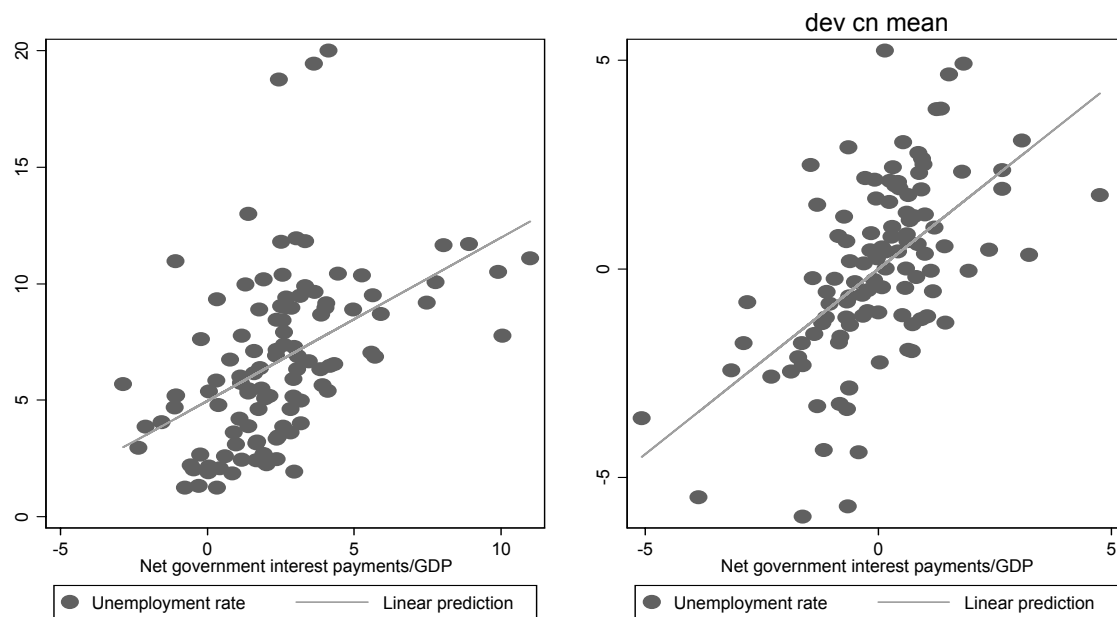


Figure 4. Public debt and unemployment.

The left-hand side panel plots 5-year averages for the countries and periods listed in the Data Appendix, the right-hand side panel plots deviations from country means of the same observations.

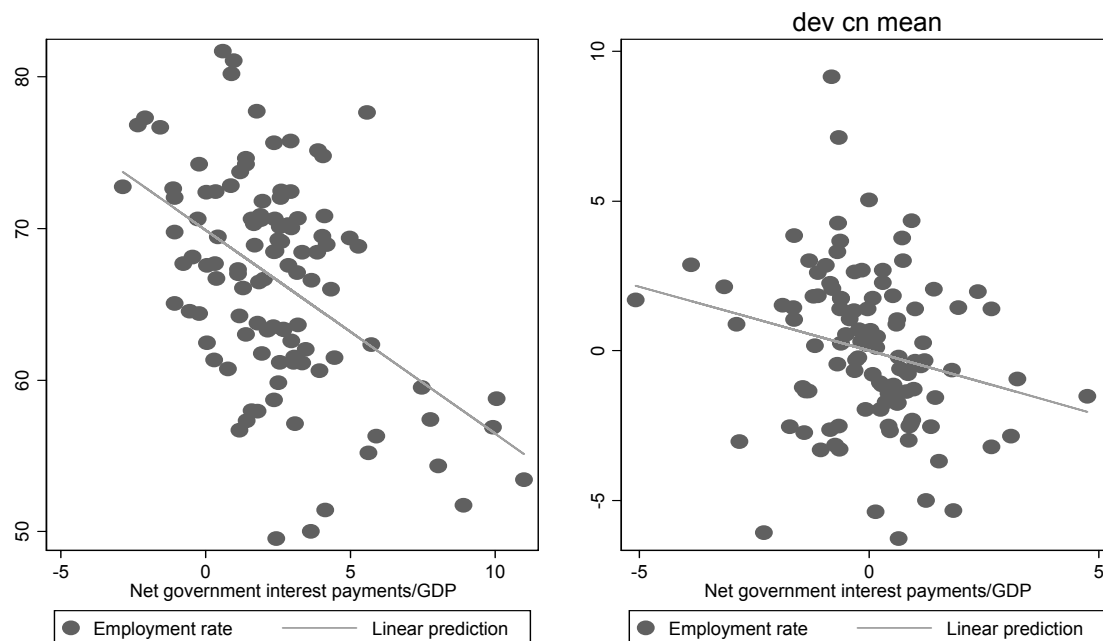


Figure 5. Public debt and employment.

The left-hand side panel plots 5-year averages for the countries and periods listed in the Data Appendix, the right-hand side panel plots deviations from country means of the same observations.

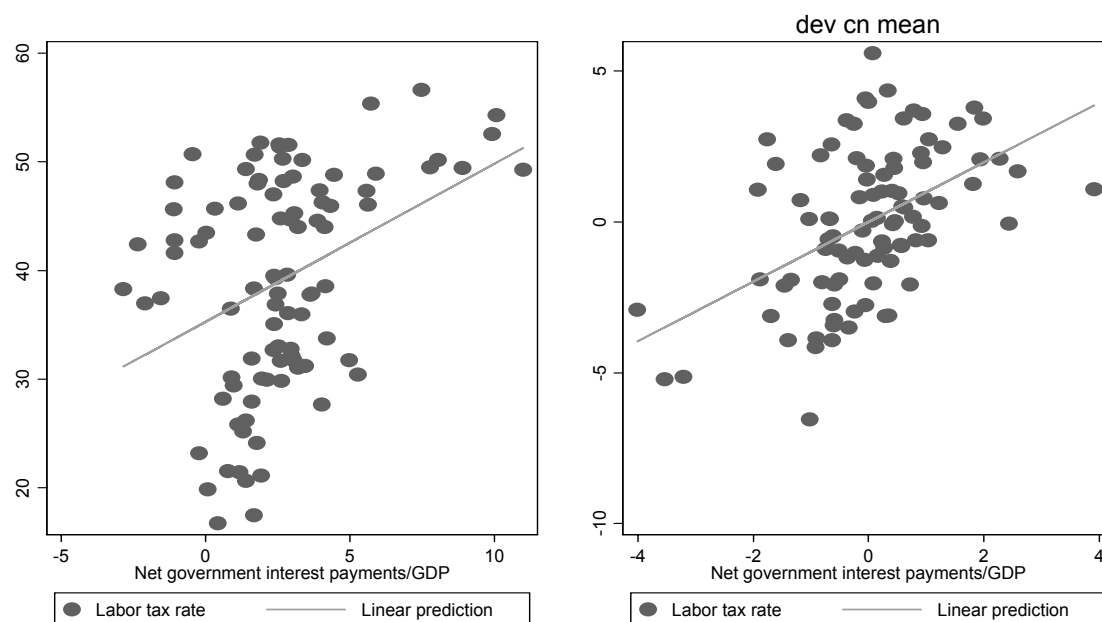


Figure 6. Public debt and labor taxation.

The left-hand side panel plots 5-year averages for the countries and periods listed in the Data Appendix, the right-hand side panel plots deviations from country means of the same observations.

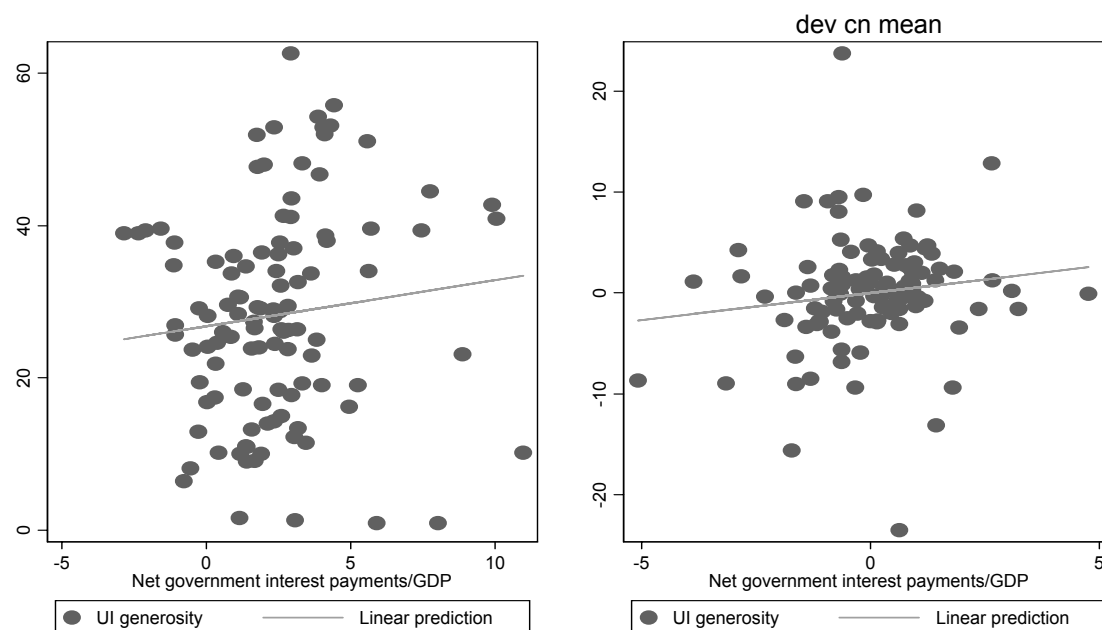


Figure 7. Public debt and Unemployment Insurance generosity.

The left-hand side panel plots 5-year averages for the countries and periods listed in the Data Appendix, the right-hand side panel plots deviations from country means of the same observations.

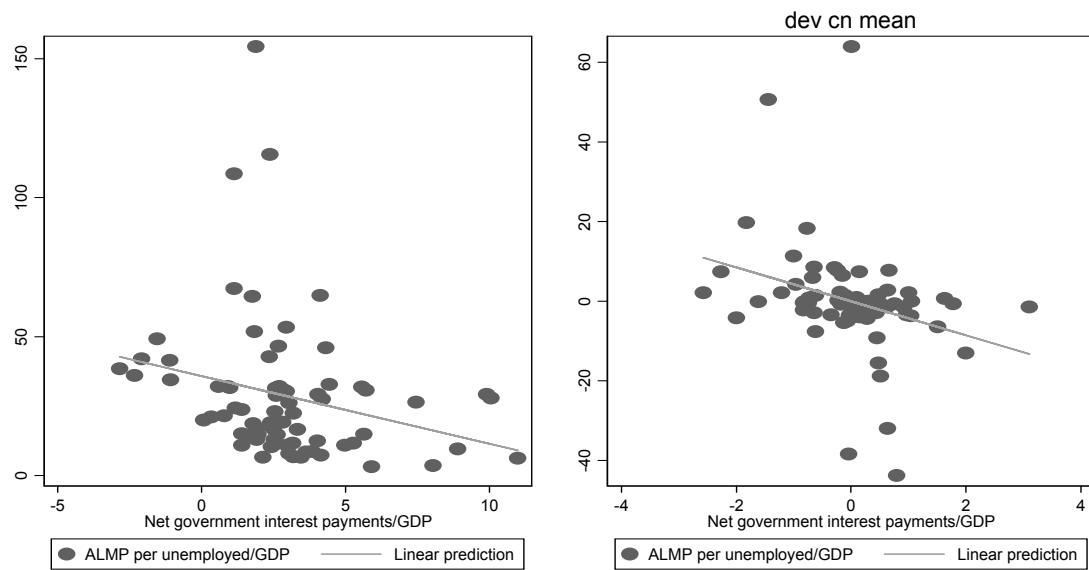
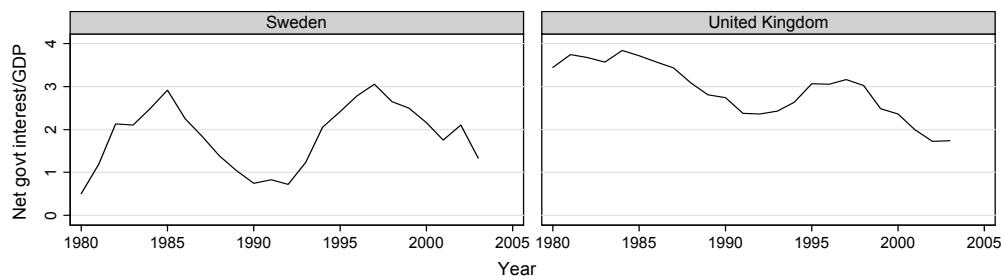
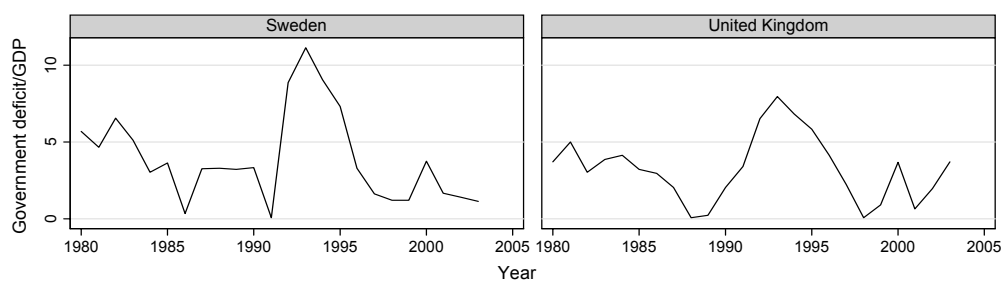


Figure 8. Public debt and Active Labor Market Policies.

The left-hand side panel plots 5-year averages for the countries and periods listed in the Data Appendix, the right-hand side panel plots deviations from country means of the same observations.

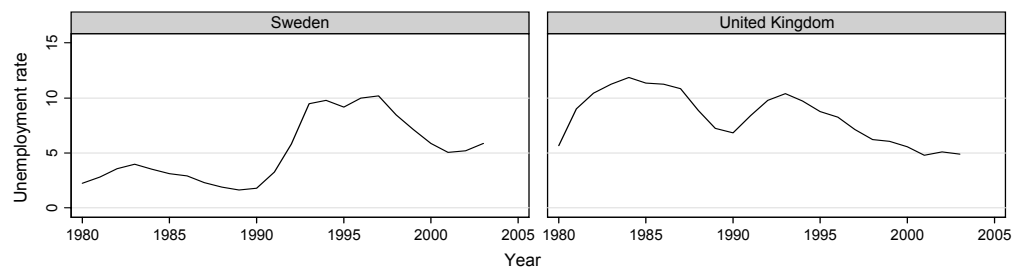


Graphs by cn

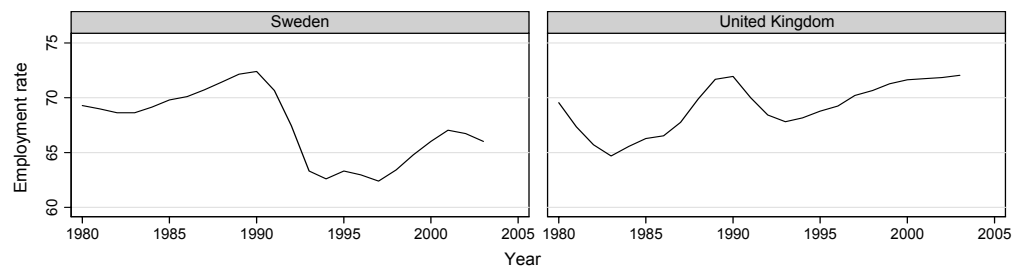


Graphs by cn

Figure 9a. Public debt and deficits in Sweden and in the UK



Graphs by cn



Graphs by cn

Figure 9b. Unemployment and employment rates in Sweden and in the UK

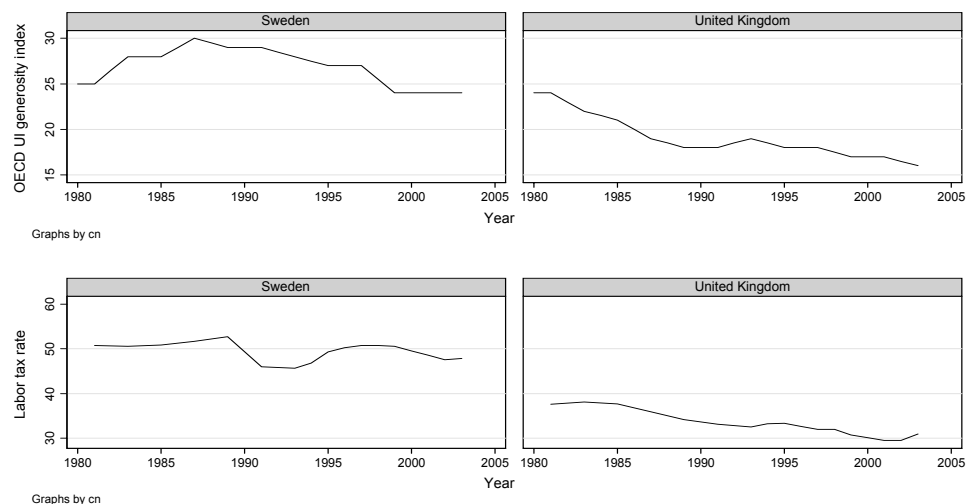


Figure 9c. Unemployment insurance generosity and labor taxes in Sweden and in the UK

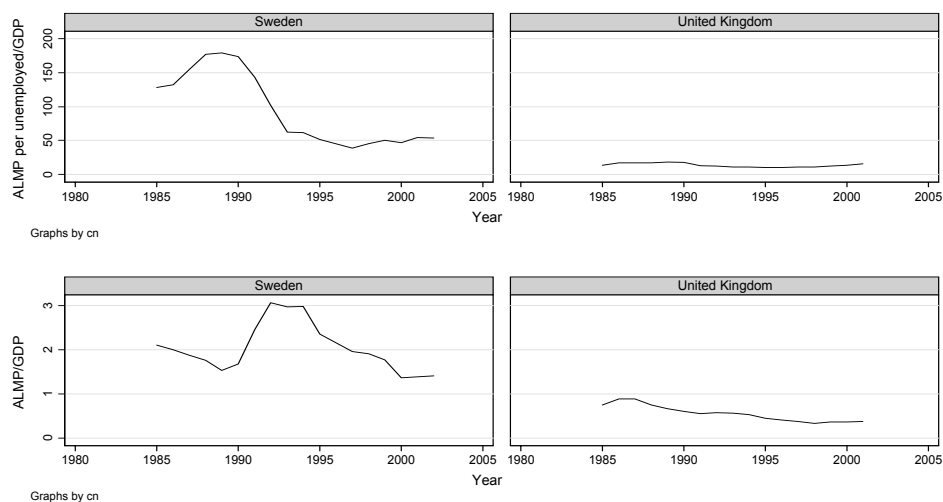


Figure 9d. Active Labor Market Policy expenditures in Sweden and in the UK

Top panel: per unemployed person as a percent fraction of per capita GDP; bottom panel: total as a percent of GDP.

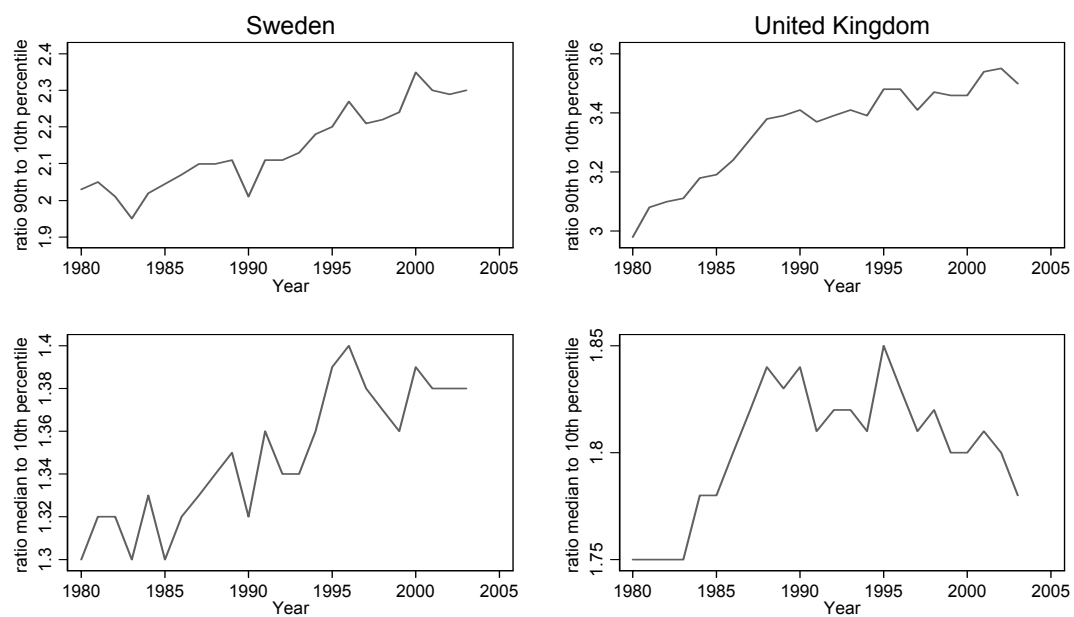


Figure 9e. Wage inequality in Sweden and in the UK.

Top panel: ratios of 90th percentile to the 10th percentile of the wage distribution; bottom panel: ratio of median wage to the 10th percentile of the wage distribution. The vertical scale is different in all graphs.